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May 30, 2017

Ms. Elizabeth Hughes
Town Planner
Town of Concord
141 Keyes Road
Concord, Massachusetts 01742

Re: Peer Review of Definitive Plan & PRD Special Permit Application
Hosmer Meadow, Keuka Road
Concord, Massachusetts

Dear Ms. Hughes and Board Members:

The Horsley Witten Group, Inc. (HW) is pleased to provide the Department of Planning and Land Management (DPLM) and Concord Public Works (CPW) with this letter report summarizing our initial engineering peer review for the Hosmer Meadow Planned Residential Development (PRD) Application and Definitive Plan Application proposed at the Keuka Road (approximately 688 Main Street) site in Concord, Massachusetts. We understand that the submission is for a proposed eleven unit residential subdivision with a mix of two bedroom townhouses and two & three bedroom, single-family homes on a 12.48 acre site with mixed uplands and wetlands.

The Applicant notes on the Plans that the project area includes an intermittent stream and bordering vegetated wetlands (BVW), which are subject to the MassDEP Wetlands Protection Act as well as non-jurisdictional isolated wetlands. The proposed project is also within the 50-foot and 100-foot buffer zones of the wetland resource areas. The Applicant is proposing to manage the stormwater from the proposed subdivision through the use of porous pavement on the first 200 feet of Keuka Road. The remaining impervious surfaces including the house roofs, driveways, and roadway will be collected in a storm drainage network designed with deep sump catch basins and Stormceptor proprietary units for pre-treatment prior to discharging into an infiltration bed. This project will require the filing of a Notice of Intent (NOI) with the Concord Conservation Commission.

The following documents and plans were received by HW:

- Definitive Subdivision Plan Application Form C, dated April 3, 2017;
- Stormwater Drainage Report, Hosmer Meadow Subdivision, prepared by Markey & Rubin, Inc., dated April 3, 2017;
- Project Narrative, Hosmer Meadow Subdivision, prepared by Markey & Rubin, dated April 3, 2017;
- Deeds and Approvals;
- Definitive Subdivision – Planned Residential Development, Hosmer Meadow Subdivision, prepared by Markey & Rubin, Inc., dated April 3, 2017, which includes:
    - Cover Sheet 1
    - Existing Conditions Plan 2
    - Subdivision Layout Plan 1 3

  - Subdivision Layout Plan 2 4
  - Site Plan 5
  - Plan and Profile 6
  - Fire Truck Turning Plan 7
  - Erosion and Sediment Control Plan 1 8
  - Erosion and Sediment Control Plan 2 9
  - Area Plan 10
  - Detail Sheet 1 11
  - Detail Sheet 2 12
- Landscape Site and Planting Plan, prepared by Sallie Hill Design LLC, dated April 3, 2017, which includes:
    - Landscape Site and Planting Plan L-1
    - Unit Planting Details LA-1
    - Front Entry Road Details LA-2
    - Plant Schedule 2 Sheets

Stormwater Review

HW has reviewed the proposed stormwater management designs as per the standards of the Massachusetts Stormwater Handbook (MSH) dated February 2008, the Massachusetts Wetlands Protection Act (M.G.L. Chapter 131, Section 40) and its implementing Regulations under 310 CMR 10.00; and the Town of Concord Stormwater Regulations/Design & Construction Standards and Details. A new development project is required to comply with the MassDEP Stormwater Management Standards completely. Comments 1-10 below relate to the standards as presented in the MSH.

1. *Standard 1: No new stormwater conveyances (e.g. outfalls) may discharge untreated stormwater directly to or cause erosion in wetlands or waters of the Commonwealth.*

   The proposed stormwater management design for the Property contains no new proposed untreated stormwater conveyance outfalls. The new proposed stormwater management system includes a series of catch basins and storm drain pipes which discharge to an infiltration bed for infiltration. Stormwater conveyed to the infiltration basins that does not infiltrate, discharges towards the wetlands via an outlet control structure with an 8-inch outlet pipe. Calculations are not provided to determine if the discharges will cause erosion or scour to the ground at the discharge point. HW recommends that the Applicant provide supporting calculations for the maximum velocity for the 2-year, 24-hour storm to assess the grounds ability to resist scour.

2. *Standard 2: Stormwater management systems shall be designed so that post-development peak discharge rates do not exceed pre-development peak discharge rates.*

   The Applicant has described the Pre-Development and the Post-Development watershed areas, drainage conditions, and discharge values as documented in the Stormwater Management Report for the Property. HydroCAD output was included in Appendix I of the Stormwater Report. To verify compliance with Standard 2, HW has the following recommendations:

   a. The Applicant provided an NRCS Soil Map, as Appendix 4.1 of the Stormwater Drainage Report, which identifies two soil map units for the project area. It appears that most of

the development (Lot A and Lot B) including the infiltration basin are within the soil map unit labeled 51A – Swansea Muck. A description of the soil unit was not provided with the Application; however, NRCS identifies this soil as very poorly drained with frequent frequency of ponding and a hydrologic soil group of B/D. On the existing conditions drainage plan the Applicant identifies the project area soils as 626B with a hydrologic soil group of A. HW recommends that the Applicant review the NRCS soil map and determine the appropriate soil type for the project area and update the drainage report as necessary.

b. Clarification of the existing and proposed grading within Lot 2 and at the proposed culvert location is required to verify the drainage model provided. The plan should be updated to provide existing and proposed spot grading at an appropriate scale to demonstrate that the change in grade and retaining wall installation from station 1+00 to 4+00 does not adversely affect the abutting parcels (#696, #712, #724, #734 Main Street) and maintains the existing natural flow patterns as required in section 2.2.1.B of the Concord Public Works Design and Construction Standards and Details (CPW-DCSD).

c. On the proposed conditions drainage map subcatchment B appears to collect all impervious cover and route it to the infiltration basin. Based on the information provided it appears that the buildings will have pitched roofs which would result in drainage to both the front and rear of the structures. It is unclear from the information provided how roof runoff will be conveyed to the pavement as referenced in the drainage report. HW recommends that the Applicant provide additional information and details about roof drainage and revise the drainage area delineation as necessary.

d. In the existing condition HydroCAD model, the Applicant uses “fair” and “poor” hydrologic condition for selection of a curb number to describe the wooded and grassed areas of the Site. Most woods in Massachusetts have forest litter and brush covering the soil and therefore should be considered in “good” hydrologic condition. For the grassed portions of the project area, it appears based on photos submitted by the Applicant, that the Site has a well established grass cover. HW recommends that the Applicant choose the curve number that corresponds to woods and grass in good hydrologic condition, which is consistent with the Massachusetts Hydrologic Handbook for Conservation Commissions, dated March 2002.

e. The existing condition route of runoff shows flow through the isolated wetland located in subcatchment A. HW recommends that the isolated wetland be treated as the design point, modeled as a pond, and the time of concentration terminated at the wetland boundary. HW also recommends that the Applicant provide Pre- and Post-Development discharge, volume and elevations for the isolated wetland.

f. The proposed route of runoff or the time of concentration does not appear on the proposed conditions drainage map. HW recommends that the Applicant provide the route of runoff to verify the time of concentrations provided in the HydroCAD report.

g. The existing and proposed conditions time of concentration is entered into HydroCAD as a direct entry; however, calculations to support this value are not provided. HW

recommends that the Applicant provide calculations to support the time of concentration values entered into the HydroCAD model.

h. The HydroCAD model for existing subcatchment 5S and 6S identifies woods with poor hydrologic conditions underlain by hydrologic soil group (HSG) D. This soil type is not identified on the drainage plans. HW recommends that the Applicant clearly identify the different land use and soil types on the drainage plans.

i. The Applicant provides a reach node in the HydroCAD model for overland travel (node 13R). It is unclear from the information provided what this reach represents. HW recommends that the Applicant clarify what the reach represents and provide justification for it.

j. The infiltration bed plan view and elevation details have conflicting outlet pipe diameters. HW recommends that the Applicant revise the detail as necessary.

3. *Standard 3 requires that the annual recharge from post-development shall approximate annual recharge from pre-development conditions.*

   a. In the HydroCAD model the exfiltration rate for the infiltration bed is listed as 8.27 inches per hour. Infiltration tests to support the selection of this exfiltration rate have not been included with the Application. HW recommends that the Applicant provide infiltration test results in accordance with the MSH for the infiltration bed and revise the HydroCAD model as necessary. Further, in accordance with the Town of Concord Drainage Standards, test holes shall be witnessed by the Concord Public Works.

   b. The sizing method (i.e., static, simple dynamic or dynamic field) and supporting calculations for the infiltration bed have not been specified or provided. HW recommends that the Applicant provide the sizing method and supporting calculations in accordance with the MSH.

   c. The Applicant has not provided supporting calculations to demonstrate that the infiltration bed will drain within 72 hours. HW recommends that the Applicant provide the calculations in accordance with the MSH.

   d. Based on the soil analysis provided by the Applicant, the depth of groundwater appears to be approximately 4.5 feet from the bottom of the proposed infiltration bed. However, it does not appear that calculations have been provided which demonstrate that the recharge system is proposed to attenuate the peak discharge from the 10-year, 24-hour storm or greater, in accordance with the MSH. Further, the Concord Drainage Standards requires attenuation of the 2, 10, 25, and 100 year storms. Therefore, HW recommends that the Applicant provide a mounding analysis or demonstrate that the proposed infiltration bed meets the requirements of the MSH and the Concord Drainage Standards.

4. *Standard 4 requires that the stormwater system be designed to remove 80% Total Suspended Solids (TSS) and to treat 0.5-inch of volume from the impervious area for water quality.*

   a. Calculations for the required Water Quality Volume (WQv) have not been provided. HW recommends that the Applicant provide the required WQv for the project.

   b. The Applicant has provided deep sump catch basins, a sediment forebay and infiltration

bed to meet the 80% TSS requirement.

5. *Standard 5 is related to projects with a Land Use of Higher Potential Pollutant Loads (LUHPPL).*

   The proposed project is not considered a LUHPPL; therefore Standard 5 is not applicable.

6. *Standard 6 is related to projects with stormwater discharging into a critical area, a Zone II or an Interim Wellhead Protection Area of a public water supply.*

   The proposed development does not appear to be within a critical area; therefore Standard 6 is not applicable.

7. *Standard 7 is related to projects considered Redevelopment.*

   The proposed project is not considered a redevelopment; therefore Standard 7 is not applicable.

8. *Standard 8 requires a plan to control construction related impacts including erosion, sedimentation or other pollutant sources.*

   a. The Applicant has provided an erosion and sediment control plan (Sheet ES1) with details. Details are provided for a construction entrance; however, the location of the construction entrance(s) is not identified on the plan. HW recommends that the Applicant identify on the Plan the location of the construction entrance(s) on the plan.

   b. The Applicant has provided straw wattles and inlet protection as sediment barriers for the project area, which then discharges to the infiltration basin during construction. HW recommends that the Applicant provide a sediment trap or alternative practice to manage runoff during construction to reduce the likelihood of the infiltration system getting clogged during construction.

   c. Proposed straw wattles appear to be proposed at the limit of work. Based on this placement, there is potential for construction site stormwater runoff to discharge to the post-construction riprap lined channel adjacent to the infiltration bed, which conveys water into the BVW. HW recommends that the Applicant consider installing straw wattles and/or a sediment trap to prevent construction site runoff from being conveyed to post-construction stormwater management practices.

   d. Erosion and sediment control barriers are not installed adjacent to the isolated wetland in Lot A, however proposed grades convey flows from the area to the isolated wetland. HW recommends that the Applicant provide erosion and sediment control to protect the isolated wetland until the proposed project area has been permanently stabilized.

9. *Standard 9 requires a Long Term Operation and Maintenance (O & M) Plan to be provided.*

   The Applicant provided a Stormwater Operation and Maintenance Plan for the Property. HW recommends the following:

   a. The Applicant has provided a Stormwater Operations & Maintenance (O&M) Plan for the proposed project. The Applicant proposed permeable pavement at the entrance of Keuka Road. O&M procedures have not been included in the O&M Plan for permeable pavement. HW recommends that the Applicant include O&M procedures for the pavement.

b. The O&M Plan indicates that snow shall be stored on site in designated areas. The designated areas are not identified on the plan. HW recommends that the Applicant indicate where snow will be stored during winter months.

10. *Standard 10 requires an Illicit Discharge Compliance Statement to be provided.*

    The Applicant has stated in the O&M Manual that illicit discharges from the property shall be cut and capped. In accordance with the MSH, an Illicit Discharge Compliance Statement is required to indicate that no illicit discharges to the stormwater management system exist on site. HW recommends that the Applicant provide the Illicit Discharge Compliance Statement signed by the property owner to the Town prior to the start of construction.

11. The Applicant provided calculations to support the design of the storm drain network for the 25-year storm event. However, in accordance with the Town of Concord Drainage Standards storm drain capacity calculations shall be performed for all conveyance BMPs (i.e., drain pipe, grass swale, etc.) utilizing the rational method for the 100-year frequency event and manning's equation for open channel flow. HW recommends that the Applicant provide calculations in accordance with the Town of Concord Drainage Standards for all conveyance BMPs.

12. In accordance with the Town of Concord Drainage Standards, a Rational Method Divide Plan is required depicting catch basin Subcatchment divides with times of concentration and areas clearly marked. HW recommends that the Applicant provide the Rational Method Divide Plan in accordance with the Drainage Standards.

13. The Applicant states that Catch Basin 1 and Drain Manhole 2 are Retain It structures. A detail of the Retain It structures for Catch Basin 1 and Drain Manhole 2 are not provided including the outlet structure, associated elevation and discharge location.

14. Calculations to support the sizing of the proposed box culvert and associated details (i.e., inverts, dimensions, material, traffic loading, etc.) have not been provided. HW recommends that the Applicant provide calculations and details for the box culvert in accordance with the Town of Concord Drainage Standards.

15. The calculations to support the design and sizing of the proposed riprap channel have not been provided. HW recommends that the Applicant provide calculations for the conveyance in accordance with the MSH and the Town of Concord Drainage Standards.

16. In accordance with the Town of Concord Drainage Standards the minimum pipe grades shall be 1 percent. All proposed pipes in the development appear to have a minimum slope less than 0.5 percent. HW recommends that the Applicant review and revise the design to meet the minimum slope requirements in the Town of Concord Drainage Standards.

17. The Applicant is proposing permeable pavement at the entrance to the site. It is unclear how the underlying soils in this area will be protected from compaction during construction. HW recommends that the Applicant provide additional details on the route of traffic to and from the site, underlying soil testing to confirm infiltration and a detailed operation and maintenance plan.

18. The infiltration bed and permeable pavement design is not consistent with the Town of Concord Drainage Standards. Section 2.2.1.E of the Drainage Standards requires all underground infiltration systems to be installed as offline systems to account for clogging of

the system. The design proposes the installation of the underground infiltration system as the primary detention system and installation of porous pavement for the first 100' of the roadway. HW recommends that the Applicant revise the design to meet the standard, remove these BMPs or update and resubmit.

19. HW recommends that the Applicant confirm and provide documentation that the Isolated Vegetated Wetland is not a vernal pool.

NPDES Review

HW reviewed the Application for compliance under EPAs 2017 Construction General Permit, effective February 16, 2017, since the project will disturb more than 1 acre. Based on this review, HW recommends the following:

1. A preliminary Stormwater Pollution Prevention Plan (SWPPP) has not been provided by the Applicant. HW recommends that the Applicant provide a preliminary SWPPP for review.
2. The Applicant provided a Construction Sequence; however, it is not broken out into phases. HW recommends that the Applicant provide a more detailed Construction Sequence with Phasing to limit the area of disturbance during a single period which also indentifies stockpile areas for each phase and ensures soils under drainage infiltration systems and septic systems are protected.

Conclusions

HW recommends that the Town of Concord require that the Applicant address these comments as part of the permitting process. The Applicant is advised that provision of these comments does not relieve him/her of the responsibility to comply with all Town of Concord Codes and Bylaws, Commonwealth of Massachusetts laws, and federal regulations as applicable to this project. Please contact Renee Bourdeau at rbourdeau@horsleywitten.com or at 603-658-1660 if you have any questions regarding these comments.

Sincerely,

HORSLEY WITTEN GROUP, INC.

Renee L. Bourdeau, P.E.
Project Manager, Water Resources Engineer